

What is Claimed is:

1. An iontophoretic drug delivery device for delivering at least one medicament to an applied area of a patient, such as the skin, mucous membrane and the like, comprising:

5 electrode assembly means for driving a medication into the applied area of the patient to be absorbed by the body of the patient, said electrode include an electrode material; and

a covalently cross linked hydrophilic reservoir situated in electrically conductive relation to the electrode assembly means, with said reservoir including an aqueous swollen cross linked water soluble polymer material having an adhesive strength to said electrode material, an adhesive strength to said applied area and a cohesive strength to itself, with said
10 reservoir containing at least one medicament;

wherein the adhesive strength of said polymer material to said electrode material is greater than the cohesive strength of said polymer material and the adhesive strength of said polymer material to said applied area is less than the cohesive strength of said polymer material so that upon removal of the device from the applied area little if any polymer
15 material remains on the applied area, while maintaining said reservoir intact and in intimate contact with said electrode material.

20 2. A reservoir electrode assembly for an iontophoretic drug delivery device comprising:

an electrode; and

a hydrophilic reservoir situated in electrically conductive relation to said electrode, said reservoir being formed from a bibulous hydrophilic cross-linked
25 polymeric material having a first surface and a second surface being adhesively adherent to said electrode, said first surface of said polymeric material being releasably adhesively adherent to an applied area of a patient's skin, said polymeric material having a cohesive strength, wherein a bond strength of an adhesive bond between said second surface of said polymeric material to said electrode is greater than the cohesive strength of said

1.0085428.022802
208220.8245001

polymeric material and an adhesive bond strength of said first surface of said polymeric material to the applied area of the patient is less than the cohesive strength of said polymeric material so that upon removal of said assembly from the applied area of the patient, substantially no polymeric material remains on the applied area and said reservoir remains substantially intact and adhesively adherent to said electrode.

3. The reservoir electrode assembly of Claim 2 wherein said hydrophilic reservoir further comprises a reinforcement to provide two-dimensional stability to said polymeric material and allow a swelling of said polymeric material in a third dimension.

4. The reservoir electrode assembly of Claim 3 wherein said reinforcement is selected from the group consisting of a woven material and a non-woven material.

5. The reservoir electrode assembly of Claim 4 wherein said reinforcement is formed from a non-woven material with a basis weight about ten to about thirty grams per square meter disposed substantially intermediate said first surface and said second surface of said bibulous hydrophilic polymeric material so that when said polymeric material imbibes an aqueous solution, said swelling of said polymeric material is substantially limited to increasing a distance between said first surface and said second surface and wherein said first surface and said second surface are substantially parallel to each other.

6. The reservoir electrode assembly of Claim 5 wherein said bibulous hydrophilic polymeric material is poly(vinylpyrrolidone) additionally being cross-linked to a preselected sufficient degree to be substantially shape retaining.

7. The reservoir electrode assembly of Claim 6 wherein said poly(vinylpyrrolidone) has a number average molecular weight above about 360,000 prior to said cross-linking.

8. The reservoir electrode assembly of Claim 6 wherein said poly(vinylpyrrolidone) is cross-linked by the application of a preselected quantity of ionizing radiation.

9. The reservoir electrode assembly of Claim 8 wherein there is a differential degree of cross-linkage of said poly(vinylpyrrolidone) between said first surface and said second surface, thereby providing a first level of tack on said first surface and a second level of tack on said second surface.

10. The reservoir electrode assembly of Claim 9 wherein said poly(vinylpyrrolidone) is swollen by a substantially uniform application to said first surface of an aqueous solution of at least one material selected from the group consisting of a medicament to be delivered to the patient, another medicament to be delivered to the patient, an electrolyte, another electrolyte, a preservative, a chelating agent, an antioxidant, a humectant and combinations thereof.

11. The reservoir electrode assembly of Claim 2 wherein said electrode is formed from an application of a coating of an electrically conductive ink to a surface of a flexible substrate on said surface disposed against said second surface of said polymeric material.

12. The reservoir electrode assembly of Claim 11 wherein said coating of said electrically conductive ink covers more than one half of said surface of said substrate disposed against said polymeric material.

13. The reservoir electrode assembly of Claim 12 wherein said coating of said electrically conductive ink covers about ninety percent of said surface of said substrate disposed against said polymeric material, said ink coating being capable of being adhesively bonded to said second surface of said polymeric material.

14. The reservoir electrode assembly of Claim 13 wherein said electrically conductive ink comprises silver and silver chloride.

15. The reservoir electrode assembly of Claim 13 wherein said electrically conductive ink has a coat weight between about 1.5 and 5 grams per square cm.

16. The reservoir electrode assembly of Claim 15 wherein said electrically coated ink has a resistivity of less than about 120 ohms per square.

5 17. The electrode assembly of Claim 2 wherein a Tack Rolling Ball Measurement (TRBM) of the adhesive tack of the bibulous hydrophilic polymeric material is between about 5mm to about 40mm after cross-linking and prior to charging said reservoir with an aqueous medicament solution.

10 18. The electrode assembly of Claim 17 wherein said TRBM of one side of said bibulous hydrophilic polymeric material is greater than about 15mm and another side of said hydrophilic polymeric material is less than about 30mm and wherein the TRBM of said sides are not the same.

15 19. The electrode assembly of Claim 2 wherein said cross-linked bibulous hydrophilic polymeric material has a swell ratio of greater than three when said bibulous hydrophilic polymeric material is charged with sufficient aqueous material to provide the preselected medicament delivery.

20 20. A reservoir electrode assembly for an iontophoretic drug delivery device comprising:

an electrode formed from an application of a coating of an electrically conductive ink to a surface of a flexible substrate; and

25 a hydrophilic reservoir situated in electrically conductive relation to said electrode, said reservoir being formed from a bibulous hydrophilic cross-linked polymeric material having a first surface and a second surface being adhesively adherent to said electrode, said polymeric material having a reinforcement therewithin to provide two-dimensional stability to said polymeric material and allow a swelling of said polymeric material in a third dimension, said first surface of said polymeric material
30 being releasably adhesively adherent to an applied area of a patient's skin, said polymeric material having a cohesive strength, wherein a bond strength of an adhesive bond

between said second surface of said polymeric material to said electrode is greater than the cohesive strength of said polymeric material and an adhesive bond strength of said first surface of said polymeric material to the applied area of the patient is less than the cohesive strength of said polymeric material so that upon removal of said assembly from the applied area of the patient, substantially no polymeric material remains on the applied area and said adherent reservoir remains substantially intact and adhesively to said electrode.

21. The reservoir electrode assembly of Claim 20 wherein said reinforcement is formed from a non-woven material with a basis weight about ten to about thirty grams per square meter disposed substantially intermediate said first surface and said second surface of said bibulous hydrophilic polymeric material so that when said polymeric material imbibes an aqueous solution, said swelling of said polymeric material is substantially limited to increasing a distance between said first surface and said second surface and wherein said first surface and said second surface are substantially parallel to each other.

add
a2

10085428 022802